WHAT IS CLAIMED IS:

1.   A scan line interpolation device for generating an interpolated pixel on an interpolated scan line from pixels disposed on at least four consecutive scan lines, including at least two scan lines on each side of the interpolated scan line, the scan line interpolation device comprising:

a pattern matching means for calculating pattern similarity values for a plurality of pixel block pairs, each pixel block pair including two pixel blocks disposed in point-symmetrical positions on opposite sides of the interpolated pixel, each of the two pixel blocks including an identical number of said pixels, the pattern similarity value of each pixel block pair being calculated from values of the pixels in its two constituent pixel blocks;

a similar edge decision means for deciding whether similar edges are present in corresponding positions in the two pixel blocks constituting each said pixel block pair, on the basis of differences between the pixel values of pixels disposed on mutually adjacent scan lines in one of the pixel blocks, aligned in a direction perpendicular to the scan lines, and differences between the values of pixels disposed in corresponding positions in the other pixel block in the same pixel block pair;

an interpolation direction decision means for selecting an interpolation direction corresponding to the positions of the two pixel blocks in a pixel block pair having a greatest similarity, as calculated by the pattern matching means, among the pixel block pairs in which the similar edge decision means decides that similar edges are present; and

an interpolation means for generating the interpolated pixel by using, as reference pixels, the pixels disposed closest to the centers of the two pixel blocks in the pixel block pair corresponding to the interpolation direction

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selected by the interpolation direction decision means.

2.   The scan line interpolation device of claim 1, wherein:
     if there are pixels at the centers of the two pixel
blocks in the pixel block pair corresponding to the selected
interpolation direction, the interpolation means generates
the interpolated pixel by using the two pixels disposed at
the centers as reference pixels; and
     if no pixels are disposed at the centers of said two
pixel blocks, the interpolation means generates the
interpolated pixel by using a plurality of pixels in each of
said two pixel blocks as reference pixels.

3.   The scan line interpolation device of claim 2, wherein
if no pixels are disposed at the centers of the two pixel
blocks in the pixel block pair corresponding to the selected
interpolation direction, the interpolation means uses, as
reference pixels, two pixels closest to the center of each
of the two pixel blocks.

4.   The scan line interpolation device of claim 1, wherein
for each pixel block pair, the pattern matching means
calculates absolute values of difference between the values
of pixels in mutually corresponding positions in the two
pixel blocks constituting the pixel block pair, takes a sum
of the calculated absolute values, and outputs the sum as
the pattern similarity value of the pixel block pair.

5.   The scan line interpolation device of claim 1, wherein
for each pixel block pair, the pattern matching means
calculates absolute values of difference between the values
of pixels in mutually corresponding positions in the two
pixel blocks constituting the pixel block pair, takes a sum
of the calculated absolute values, weights the sum according

to the number of pixels per block, and outputs the sum as the pattern similarity value of the pixel block pair.

6. The scan line interpolation device of claim 1, wherein for each pixel block pair, the pattern matching means calculates absolute values of difference between the values of pixels in mutually corresponding positions in the two pixel blocks constituting the pixel block pair, weights the absolute values, takes a sum of the weighted absolute values, and outputs the sum as the pattern similarity value of the pixel block pair.

7. The scan line interpolation device of claim 1, wherein the similar edge decision means decides that similar edges are present when the following three conditions are all satisfied:

the difference between the values of two pixels disposed on mutually adjacent scan lines in one constituent pixel block in a pixel block pair, aligned perpendicularly to the scan lines, is greater than a predetermined value;

the difference between the pixel values of two pixels disposed in corresponding positions in the other constituent pixel block in the same pixel block pair is greater than the predetermined value; and

the two differences have the same sign.

8. The scan line interpolation device of claim 1, wherein the interpolation direction selected by the interpolation direction decision means is the direction of a line joining the centers of the two pixel blocks in the pixel block pair having the greatest similarity, among the pixel block pairs in which the similar edge decision means decides that similar edges are present.

9.   The scan line interpolation device of claim 1, wherein
the interpolation direction decision means selects an
interpolation direction perpendicular to the scan lines if
the direction of a line joining the centers of the two pixel
blocks in the pixel block pair having the greatest
similarity differs from the direction of a line joining the
centers of the two pixel blocks in the pixel block pair
having a second greatest similarity, among the pixel block
pairs in which the similar edge decision means decides that
similar edges are present, by more than a predetermined
amount.

10.   The scan line interpolation device of claim 1, further
comprising an exception decision means for testing for the
presence of an edge perpendicular to the scan lines by
taking differences between at least the values of the two
pixels adjacent to the interpolated pixel in a direction
perpendicular to the scan lines and pixels adjacent to said
two pixels in the direction of the scan lines, wherein if
the exception decision means finds an edge perpendicular to
the scan lines, the interpolation direction decision means
disregards the pattern similarities calculated by the
pattern matching means and the decisions made by the similar
edge decision means, and selects the direction perpendicular
to the scan lines as the interpolation direction.

11.   The scan line interpolation device of claim 1, further
comprising an isolated direction correction means for
changing the interpolation direction selected by the
interpolation direction decision means to a direction
perpendicular to the scan lines if said interpolation
direction differs by more than a predetermined amount from
the interpolation directions selected by the interpolation
direction decision means for the adjacent interpolated

pixels on both sides of the interpolated pixel on said interpolated scan line.

12. The scan line interpolation device of claim 1, further comprising:

a still-image interpolator for generating interpolated pixels by performing inter-field interpolation;

a motion detector for deciding whether an interpolated pixel is included in a nonmoving image part or a moving image part; and

a combiner for combining the interpolated pixels generated by the still-image interpolator with the interpolated pixels generated by the interpolation means according to the decision made by the motion detector.

13. An image processing device comprising the scan line interpolation device of claim 1, further comprising an image processor for making image adjustments to an input video signal and supplying the adjusted input video signal to the scan line interpolation device.

14. An image display device comprising the image processing device of claim 13, further comprising a display means for displaying an image according to the video signal supplied from the image processor and interpolated pixels generated by the scan line interpolation device in the image processing device.

15. A scan line interpolation method for generating an interpolated pixel on an interpolated scan line from pixels disposed on at least four consecutive scan lines, including at least two scan lines on each side of the interpolated scan line, the method comprising:

calculating pattern similarity values for a plurality

of pixel block pairs, each pixel block pair including two
pixel blocks disposed in point-symmetrical positions on
opposite sides of the interpolated pixel, each of the pixel
blocks including an identical number of said pixels, the
pattern similarity value of each pixel block pair being
calculated from values of the pixels in its two constituent
pixel blocks;

    deciding whether similar edges are present in
corresponding positions in the two pixel blocks constituting
each said pixel block pair, on the basis of differences
between the pixel values of pixels disposed on mutually
adjacent scan lines in one of the pixel blocks, aligned in a
direction perpendicular to the scan lines, and differences
between the values of pixels disposed in corresponding
positions in the other pixel block in the same pixel block
pair;

    selecting an interpolation direction corresponding to
the positions of the two pixel blocks in a pixel block pair
having a pattern similarity value indicating greatest
similarity, among the pixel block pairs in which similar
edges are present; and

    generating the interpolated pixel by using, as
reference pixels, the pixels disposed closest to the centers
of the two pixel blocks in the pixel block pair
corresponding to the selected interpolation direction.

16.   The method of claim 15, wherein generating the
interpolated pixel further comprises:

    if there are pixels at the centers of the two pixel
blocks in the pixel block pair corresponding to the selected
interpolation direction, using the two pixels disposed at
the centers as reference pixels; and

    if no pixels are disposed at the centers of said two
pixel blocks, using a plurality of pixels in each of the two

pixel blocks as reference pixels.